HCR

10

<TARGET><BILL>HCR 10</BILL><SUBJECT>HCR
10</SUBJECT><COMM>HCRA27</COMM></TARGET>

Alaska State Legislature

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Representative Pete Petersen
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Sponsor Statement

HCR 10
Encouraging Waste-to-Energy Technology

This resolution encourages the state, municipalities, and private organizations to consider the benefits of costs of waste-to-energy technology and evaluate whether this technology is appropriate for their energy and waste management needs.

Across the state, residents, communities, and businesses have been struggling to pay high energy costs, and waste management is a continuing challenge and expense for communities. Waste-to-energy technology produces renewable energy from garbage while reducing the amount of landfill space needed. Modern waste-to-energy actually produces fewer emissions than if the garbage were simply dumped in a landfill.

Waste-to-energy technology has been utilized across the world and in 24 states, including Alaska. For example, at Eielson Air Force Base garbage is burned along with coal to generate electricity, and the Municipality of Anchorage is in the process of developing the ability to use natural gas produced by the Anchorage Regional Landfill.

Last year the Legislature adopted a statewide energy policy that established a goal of creating 50% of our electricity from renewable energy sources. Waste-to-energy technology has the potential to help Alaska meet this goal while also reducing the need for additional landfill space.

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Summary of Changes from the Original to CSHCR 10 (ENE) (Version B)

HCR 10
Encouraging Waste-to-Energy Technology

The only change in this version is correcting and error on page 2 line 1. This version correctly notes that waste-to-energy technology is being utilized at Eielson Air Force Base, not Fort Wainwright.

FISCAL NOTE

STATE OF ALASKA
2011 LEGISLATIVE SESSION

Fiscal Note Number	
Bill Version	HCR 10
() Publish Date	

Identifier (file name)	HCR10-LEG-COU-04-04-2011	Dept. Affected	Legislature
Title	"Encouraging Waste-to-Energy Technology"	Appropriation	Legislative Council
		Allocation	Session Expenses
Sponsor	Representative Petersen		
Requester	House Spec Comm on Energy, Comm & Reg Affairs	OMB Component Number	782

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2012**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL EXPENDITURES							
CHANGE IN REVENUES							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Estimate of any current year (FY2011) cost ________

POSITIONS

Full-time							
Part-time							
Temporary							

Why this fiscal note differs from previous version

Initial Version

Prepared by	Shane Miller, Finance Manager	Phone	465-6626
Division	Administrative Services Division	Date/Time	4/4/11 7:16 AM
Approved by	Pamela Varni, Executive Director	Date	4/4/2011
	Legislative Affairs Agency		

(Revised 12/29/2010 OMB)

STATE OF ALASKA
2011 LEGISLATIVE SESSION

BILL NO. HCR 10

Analysis

This fiscal note has zero impact on the Legislative Affairs Agency.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

AUG 1 0 2007

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Emissions from Large and Small MWC Units at MACT Compliance

FROM: Walt Stevenson
OAQPS/SPPD/ESG (D243-01)

TO: Large MWC Docket (EPA-HQ-OAR-2005-0117)

This memorandum presents information on the overall emissions reductions achieved by large and small municipal waste combustion (MWC) units following retrofit of Maximum Achievable Control Technology (MACT). This memorandum is a companion to the memorandum titled "Emissions from Large MWC Units at MACT Compliance (note a). Consistent with Clean Air Act (CAA) section 129, large and small MWC units completed MACT retrofits by December 2000 and December 2005, respectively. The performance of the MACT retrofits has been outstanding. Emission reductions achieved for all CAA section 129 pollutants are shown below. Of particular interest are dioxin/furan and mercury emissions. Since 1990 (pre-MACT conditions), dioxin/furan emissions from large and small MWCs have been reduced by more than 99 percent, and mercury emissions have been reduced by more than 96 percent. Dioxin/furan emissions have been reduced to 15 grams per year* and mercury emissions reduced to 2.3 tons/year.

Emissions From Large and Small MWC Units

Pollutant	*1990 Emissions (tpy)*	*2005 Emissions (tpy)*	*Percent Reduction*
CDD/CDF, TEQ basis*	4400	15	99+ %
Mercury	57	2.3	96 %
Cadmium	9.6	0.4	96 %
Lead	170	5.5	97 %
Particulate Matter	18,600	780	96 %
HCl	57,400	3,200	94 %
SO_2	38,300	4,600	88 %
NO_x	64,900	49,500	24 %

(*) dioxin/furan emissions are in units of grams per year toxic equivalent quantity (TEQ), using 1989 NATO toxicity factors; all other pollutant emissions are in units of tons per year.

The MACT performance data presented above is from the initial MACT compliance tests from all large and small MWC units. The inventory of large MWC units at MACT compliance identifies 167 large MWC units located at 66 MWC plants (note b). The inventory of small MWC units at MACT compliance identifies 60 small MWC units located at 22 MWC plants (note c). The baseline 1990 emissions data are from the large and small MWC emissions trend memo (note d and e). In combination, the above information defines the 1990 and 2005 emissions for large and small MWC units.

notes

(a) see docket A-90-45, item VIII-B-11.
(b) see docket A-90-45, item VIII-B-6
(c) see docket OAR-2004-0312, "National Inventory of Small Municipal Waste Combustor (MWC) Units at MACT Compliance (Year 2005)", dated November 1, 2006.
(d) see docket A-90-45, item VIII-B-7
(e) see docket OAR-2004-0312, "National Emissions Trends for Small Municipal Waste Combustion Units [year 1990 – 2005]", dated June 12, 2002.

Waste-to-Energy Facilities Provide Significant Economic Benefits

White Paper

The Solid Waste Association of North America (SWANA)

Background

Waste-to-energy is a reliable and renewable form of energy that has become the basis for many of the most successful solid waste management systems in the country. More than 80 plants throughout the United States have allowed municipalities to reduce their greenhouse gas emissions and the amount of waste sent to landfills, while also benefitting the communities financially. These facilities require a significant capital investment and are typically financed through the sale of municipal revenue bonds. Waste-to-energy facilities then generate revenues through tipping fees and the sale of recovered metals and renewable energy and these revenues are then used to repay the principal and interest on the bonds.

Despite their history of being environmentally and economically sound technologies, recent news stories about the waste-to-energy facility in Harrisburg, Pennsylvania, have raised questions about the financial performance of these operations. As this paper will demonstrate, the Harrisburg situation is an anomaly and there are many examples of financially sound and successful waste-to-energy facilities across North America. This paper will summarize some of those successful operations.

Lancaster County, Pennsylvania

The Lancaster Solid Waste Management Authority's (LCSWMA) waste-to-energy facility performs a critical role in Lancaster County, Pennsylvania's integrated system. With the primary goal of minimizing landfill consumption, the waste-to-energy facility boasts a functional value of protecting one of the area's most valuable resources---farmland. Additionally, the facility reduces the volume of waste processed by 90 percent. This has extended the life of Lancaster County's landfill by more than 20 years.

The waste-to-energy facility provides a revenue stream from the sale of electricity and powers over 30,000 area homes. On average, 500 tons of ferrous metal and 16 tons of non-ferrous metal are removed from the processed waste and recycled each month, offering an additional revenue source. Because of long term operating contracts and a fixed debt payment structure, the waste-to-energy facility offers stable tipping fees for municipal waste. Lancaster County's tipping fee is $62 per ton,$7 per ton *less* today than it was when the waste-to-energy facility first opened in 1991.

The following is a list of achievements over the past 20 years:

- Processed over 7.5 million tons of waste which, if landfilled, would have occupied 190 acres of farmland, 100 feet deep
- Recovered and recycled over 128,000 tons of ferrous metal and 800 tons of non-ferrous metal
- Generated 4.4 billion kilowatt-hours of electricity, enough to power all Lancaster County homes for three years
- Produced over $256 million in electric revenue

The original cost of the facility was $135 million and the final payment will take place in 2015. The facility's bonds are currently rated A3 from Moody's.

York County, Pennsylvania

The York County Solid Waste and Refuse Authority owns the York County Resource Recovery Center, which has processed the county's combustible municipal waste since late 1989. The facility, currently operated by Covanta York Renewable Energy, LLC, processes approximately 430,000 tons of waste per year; approximately 75 percent of which is generated in York County. Waste processing capacity in excess of county needs is filled through a combination of long and short term contracts with other municipal entities and private waste haulers. The facility typically sells approximately 30 megawatts of electricity to Metropolitan Edison.

In 2010, Standard and Poor's raised its issuer credit rating on the Authority to AA from A+, and Moody's affirmed its A2 rating on the Authority's outstanding bonds. Those agencies cited the Authority's strong liquidity position, key contracts for waste supply, facility operations and electric sales, the Authority's history of strong debt service coverage, and competitive tipping fees as the basis for those ratings. Due to successful facility operations and favorable contracts, the Authority is well positioned to reinvest in the facility in order to provide long term waste processing capacity for York County.

Palm Beach County, Florida

The Solid Waste Authority of Palm Beach in West Palm Beach, Florida, is currently building a second waste-to-energy facility that will increase its capacity by an additional 3,000 tons per day and generate an estimated 97 megawatts of electricity. The success of the authority's original waste-to-energy facility allowed for the current expansion, which is scheduled to be finalized in 2015. The new waste-to-energy facility is being financed through a series of bond sales, Authority operating funds, and a capacity payment from the power purchaser, Florida Power & Light Company.

Repayment of the bonds will be from revenues of the Authority, which include revenues from the sale of electricity, recovered materials, commercial tipping fees and non-ad valorem assessments. The current annual non-ad valorem assessment for a single family homeowner is $166. This assessment is estimated to increase to only between $180 and $185 per year in 2015 with the development of the new waste-to-energy facility.

In October, Standard & Poor's upgraded the authority's bonds to AA+ after a thorough evaluation of the authority's operations and financial history.

Pinellas County, Florida

Pinellas County Solid Waste is an enterprise fund with four primary funding sources: tipping fee revenue, electrical sales revenue, capacity payments from the energy company, and revenue from recycling. The tipping fee has been $37.50 per ton since 1986, a significantly lower rate than any of the surrounding facilities and competitive with area landfills. Revenues are used to pay for salaries and operating costs, to build reserves and fund capital projects for both the plant and landfill, and to pay off debt. The County owns, but contracts out operation of, the waste-to-energy plant. And the per ton cost for processing waste at the waste-to-energy plant is approximately $28.00 per ton, which includes contractor payments, utilities, chemicals, insurance, etc.

Electricity sales and other revenues bring total revenues up to about $80 million against a total operating budget, including allocations, of about $58 million, showing a significant revenue stream each year. The solid waste system in Pinellas is so successful that the county board authorized up to $80 million to be borrowed from the solid waste reserve fund to help fund the county capital improvement projects.

Marion County, Oregon

Marion County has utilized a waste-to-energy facility to process the solid waste generated within the county since 1986. The Marion County facility generates approximately 11 megawatts of renewable electricity---enough to power about 7,000 homes, reducing the volume of material to be ultimately disposed of by 90 percent. Additionally, waste-to-energy has helped to reduce the amount of greenhouse gases produced locally from solid waste sources.

The revenues generated from the sale of renewable energy to Portland General Electric help to fund the County's integrated solid waste management program. This program includes extensive waste reduction, reuse, recycling, and composting programs, which have enabled Marion County to regularly have the highest recovery rate in the state, currently at 58.2 percent.

Spokane, Washington

The Spokane Regional Solid Waste System has just completed its first 20 years of operation, and became "debt free" with the last bond payment on December 1, 2011. During those 20 years, Spokane increased its recycling rate from 28 percent to approximately 50 percent. Of the waste remaining after waste reduction and recycling efforts, Spokane has combusted about 80 percent and composted 10 percent, leaving only 10 percent to be landfilled. Their waste to energy facility has recovered over 200,000 tons of ferrous metal and over 2.8 billion kilowatt hours of electricity.

As other communities in the state and region have relied increasingly on long haul transportation to distant regional landfills, most of Spokane's disposal needs are handled locally, retaining the wages and economic benefits within the community. Currently, private industry is developing a regional materials recovery facility adjacent to the waste-to-energy facility, which will contribute an additional $10 million per year to the local economy.

Portland, Maine

Portland, Maine's solid waste is handled by *ecomaine,* a non-profit waste management company owned and operated by 21 municipalities in Southern Maine. With an additional 23 contracted communities, *ecomaine* provides services to a combined population of 335,000. The company owns and operates three facilities---a waste-to-energy plant, a single-stream recycling facility, and a landfill/ashfill operation---that are all ISO 14001 certified for excellence in environmental management.

The waste-to-energy plant was built in 1988 and processes 175,000 tons per year. Its two mass burn water wall boilers produce over 100,000 megawatts-hours of electricity annually, enough to serve all the homes in South Portland and Gorham. The plant, which averaged 94% availability last year, employs the use of CEMS, SDA, SNCR, carbon injection, and electrostatic precipitator technology for emissions control and monitoring. The company's investment in waste-to-energy has reduced the volume of waste by 90 percent, leaving only ash to be buried at the landfill. The facility, which cost $93 million to build, will be paid off in 2015.

Lee County, Florida

The Lee County waste-to-energy plant is the focal point of its integrated solid waste management system. The facility recently underwent a major expansion and in 2010 became the first waste-to-energy facility in the United States to generate carbon credits based on its emissions reductions. The facility, located in Fort Myers, processes 1,800 tons per day, generating 59 megawatts of electricity. The strength of the system is exemplified in the upgrade of over $85 million in bonds from A- to A in 2011. Fitch Ratings decided to upgrade the rating based on the County's solid waste system's strong and overall consistent financial position, deleveraging of the system resulting in improved debt service coverage, and a strong cash position.

Hillsborough County, Florida

The waste-to-energy facility in Hillsborough County underwent a 50 percent expansion in 2009, increasing its capacity to 1,800 tons per day, while generating nearly 47 megawatts of renewable energy. Fitch Ratings has upgraded nearly $150 million worth of Hillsborough solid waste bonds from A-to A+, citing the system's strong financial operations, ample surplus revenues to service debt, above-average reserve levels, and the County's covenant to raise rates at minimum levels as per the series 2006 bond ordinance.

SWANA's Applied Research Foundation Report Conclusions

SWANA's Applied Research Foundation has released a report, titled "The Economic Development Benefits of Waste-to-Energy Facilities". The report concludes that

- Over the lifespan of a waste-to-energy facility, communities can expect to pay less for MSW disposal than at a regional landfill.
- Monies spent on waste-to-energy facilities remain within the communities, while 90 percent of the monies spent on landfills will be transferred out of the local economy.
- Waste-to-energy facility construction generates high-paying jobs that cannot be outsourced.
- Waste-to-energy facilities generate significant amounts of baseload renewable energy which can be sold to the local power grid.

Conclusion

Waste-to-energy facilities are economically sound investments that provide multiple financial and environmental benefits to the communities that utilize them. Today, the majority of the nation's waste-to-energy facilities are owned by local governments that have invested in this critical municipal infrastructure to achieve long-term solid waste management solutions. These facilities produce clean, renewable energy while reducing waste volume by 90 percent, making them a great option for communities seeking the most advanced technology to manage their waste.

As shown in this paper, when properly managed, waste-to-energy facilities offer a multitude of benefits to the communities that utilize them. They generate revenue through the sale of electricity, tipping fees, and profits from the sale of recovered metals, which allows for the repayment of their municipal bonds, as well as financing of other important aspects of MSW management, such as extensive recycling programs. The economic success of waste-to-energy for several decades throughout the country should provide confidence to other communities considering this economically and environmentally sound technology.

Sources:

This white paper was authored by Shannon Crawford, Manager of Government Affairs for the Solid Waste Association of North America, to illustrate the financial successes of waste-to-energy facilities in the United States. Ms. Crawford would like to thank the following people for their input and assistance:

Jeff Bickford, Environmental Services Division Manager, Marion County Department of Public Works

Russ Menke, PE, Director, Spokane Regional Solid Waste System

Kelsi Oswald, WTE Program Manager, Pinellas County Department of Environment and Infrastructure

Kevin Roche, General Manager, ecomaine

Dave Vollero, Executive Director, York County Solid Waste and Refuse Authority

Jim Warner, CEO, Lancaster County Solid Waste Management Authority

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Waste-to-Energy:
A Renewable Energy Source from Municipal Solid Waste

EXECUTIVE SUMMARY

ASME SWPD Supports WTE - The Solid Waste Processing Division (SWPD) of the American Society of Mechanical Engineers (ASME) supports national policies that encourage the recovery of energy from the controlled combustion of municipal solid waste (MSW), also called Waste to Energy (WTE).

Proven Technology - WTE is a proven, environmentally sound process that provides reliable electricity generation and sustainable disposal of post-recycling MSW. WTE technology is used extensively in Europe and other developed nations in Asia such as Russia, Japan, Singapore, and Taiwan.

WTE Reduces Greenhouse Gases - New policies to encourage WTE can have a sizable effect on reducing the nation's greenhouse gas emissions.(1) In fact, nation-wide use of the WTE technology can become one of the big contributors to America's planned reduction in greenhouse gas emissions.

WTE Reduces Dependence on Fossil Fuel - New policies to encourage WTE can also have a meaningful impact in reducing dependence on fossil fuels and increasing production of renewable energy. MSW is currently comprised of 56% biogenic and 44% non-biogenic materials (2). Combusting the biogenic fraction of WTE is considered renewable by the DOE (1). Currently, there are 86 WTE facilities in the U.S. that process 29 million tons of MSW per year (1). The nation currently landfills about 248 million tons of waste per year so there is significant potential to increase energy production from WTE. Every ton of MSW processed in a WTE facility avoids the mining of one third ton of coal or the importation of one barrel of oil. If all waste were processed in modern WTE facilities it could satisfy 3 to 4 percent of the country's electricity demand.

Additional Environmental Benefits of WTE -

- Complements recycling and reduces landfilling
- Reduces truck traffic and associated emissions
- Recovers and recycles metals thus reducing mining operations

WTE Provides Clean Energy – WTE technology has significantly advanced with the implementation of the Clean Air Act (3), dramatically reducing all emissions. The EPA concluded WTE now produces electricity with less environmental impact than almost any other source (Letter of EPA Administration to Integrated Waste Services Association, Feb. 14. 2003).

Reliable Electricity – WTE operates 24/7 to reduce base load fossil fuel generation and is desirably located in proximity to urban areas where the power is needed the most.

ASME SWPD Recommendations to Congress and the Administration:

- Include WTE in the federal Renewable Portfolio Standard.
- Consider the reduction in greenhouse gases benefits of WTE in climate change policy.
- Direct the EPA to consider "life cycle analysis" of waste disposal options and also to consider Maximum Achievable Control Technology (MACT) type regulations on all emission sources, as have been applied to WTE facilities.

Introduction

ASME represents 127,000 engineers who are engaged in every aspect of energy generation and utilization. The Solid Waste Processing Division (SWPD) of ASME is dedicated to the recovery of energy and materials from the solids discarded by society and the environmental quality of technologies used in all aspects of waste management.

Municipal solid waste (MSW) is an unavoidable by product of human activities. Waste management is a particularly serious issue in the US because we consume an estimated 20 to 25 percent of the world's energy and materials and generate twice as much MSW per capita as developed nations in the European Union and Japan. Therefore, there exists a great need for waste reduction and recycling of materials. However, international and US experience has shown that after recycling there remains a large fraction of MSW to be disposed of.

The two proven means for disposal are burying MSW in landfills or combusting it in specially designed chambers at high temperatures, thereby reducing it to one tenth of its original volume. The heat generated by combustion is transferred to steam that can flow through a turbine to generate electricity. This process is called waste-to-energy (WTE). It converts the energy from combustion of MSW to electricity and recovers and recycles the metals contained in the MSW while the remaining ash is either used in landfills for daily cover and landfill roads or cleaned up and used off site for other construction purposes (as is done now in the EU and Japan).

The US WTE industry has existed for over thirty years and its technology has continuously been improved. For example, MSW combustion facilities of all types were once considered a significant source of mercury and dioxin emissions. However, during the 1990's, the WTE industry implemented new EPA regulations on Maximum Achievable Control Technology (MACT) and WTE power plants have become one of the cleanest sources of electricity and heat energy.

Currently there are 86 WTE facilities in the U.S. processing 29 million tons of MSW annually and generating 2.3 GW of electricity. Every ton of MSW processed in a WTE facility avoids the mining of one third ton of coal (9.6 million tons per year) or the importation of one barrel of oil (29 million barrels per year). As our nation begins to focus on conservation and renewables, WTE has already proved to be a reliable technology.

Unfortunately, there have been some setbacks. For instance, the Supreme Court Carbone ruling on "Flow Control" in 1994 (C & A Carbone v. Town of Clarkstown, New York, 511 U.S. 383 (1994)[(4)] forced many major urban areas in the U.S. to opt for long distance transport of their solid wastes to newly built giant landfills and stopped the growth of this useful energy producing technology in the US. Consequently, from 1995 through 2006, there were no new WTE plants built in the nation. A more recent Supreme Court decision on Flow Control has restored the ability of communities to control the flow of wastes to WTE facilities.

In contrast to what was happening in the U.S., from 1995 through 2006, hundreds of new WTE facilities were built in the European Union, Japan, China, and over thirty other nations where landfilling is regarded as environmentally undesirable and energy- and land-wasteful. In fact, in the years 2000-2007, the global WTE capacity grew at the rate of about four million tons each year. The growth of WTE in the European Union is partly due to a directive of the European Community that mandates that wastes containing over 2 percent combustible material shall not be landfilled in order to reduce landfill emissions of methane, the second most important greenhouse gas, and preserve land for future generations.(5)

In the U.S., as major urban areas have run out of nearby landfill space, post-recycled MSW is increasingly being transported long distances to other states for burial.(6) This has substantially increased the cost to landfill this MSW, and has also increased the associated environmental impacts because of the emissions from transport vehicles to and from the landfills. It has also increased the environmental advantages of WTE versus landfilling. As a result, some WTE facilities have recently begun to expand their capacity by adding new processing lines to their existing operations. These facilities are basing their requests for financing and permitting on their successful records of operation and environmental compliance.

The Conventional WTE Process

The conventional WTE combustion process is similar to the stoker burners in many coal- and wood-fired boilers. Waste is continuously fed onto a moving grate in a furnace where high temperatures are maintained. Air is added to the combustion chamber to ensure turbulence and the complete combustion of the components to their stable and natural molecular forms of carbon dioxide and water vapor.

The hot combustion gases released during the WTE process are directed through boilers to generate superheated steam that can drive turbine generators that produce electricity. Exhausted steam can also be used efficiently for district heating and for industrial processing if those choices are available.

It is interesting to note that, according to the EPA and IPCC protocols, combusting the biogenic fraction of MSW (about 56 percent of the carbon in MSW) results in a GHG reduction because these waste materials decompose into nearly equal portions of carbon dioxide and methane gas if they are landfilled. Methane is 21 times more potent as a GHG than carbon dioxide.

Energy Benefits of WTE

MSW, depending upon the moisture and energy content of the waste materials, is a good fuel source. The thermal treatment of MSW results in the generation of 500-600 kWh of electricity per ton of MSW combusted. European WTE facilities often recover another 600 kWh in the form of steam or hot water that is used for district heating. This additional energy recovery is not generally achieved in the US due to the absence of district heating systems. The corresponding savings in fossil fuel use range from one to two barrels of oil per ton of MSW.

Renewable Energy Source

WTE is designated as renewable by the 2005 Energy Policy Act, by the US Department of Energy (DOE), and by twenty-three state governments. Excluding hydroelectric power, only 2 percent of the US electricity is generated from renewable energy sources. A third of this renewable energy is due to WTE which at this time processes about 8 percent of the US MSW, while nearly 64 percent is landfilled (2004 BioCycle/Columbia national survey; www.wtert.org/sofos/SOG2006.pdf). As of July, 2008, energy recovered from WTE plants in the US is greater than all wind and solar energy combined.

Environmental Benefits

In addition to its energy benefits, WTE avoids the conversion of greenfields to landfills. The 2,500-acre Freshkills landfill of New York City filled up in about 50 years. Under current regulations (daily cover, etc.), it would have filled in 20-25 years. Although the US is blessed with abundant land, the continuous use of land for landfilling is not sustainable, especially in the coastal areas that are experiencing the highest population growth.

Since WTE facilities are a point source of emissions, they have been subjected to very stringent environmental regulations. This is not possible for landfills which are dispersed sources extending over hundreds of acres. For example, EPA assumes that 75 percent of the landfill gas (LFG) is captured in landfills that are equipped for such capture. Other studies estimate the actual LFG capture to be much lower since, under current EPA regulations, landfills are not required to capture LFG during the first five years of operation of a cell.

Landfill gas contains about 50 percent methane which is 21 times more potent as a greenhouse gas than carbon dioxide.(7) Comparative studies of WTE and landfilling have shown that for each ton of MSW combusted, rather than landfilled, the overall carbon dioxide reduction can be as high as 1.3 tons of CO2 per ton of MSW when both the avoided landfill emissions and the avoided use of fossil fuel are taken into account.

WTE processing of MSW has the additional benefit of reducing the transport of MSW to distant landfills and the attendant emissions and fuel consumption. It also reduces interstate truck traffic. According to U.S. Department of Transportation traffic statistics, an average of 7 deaths and over 40 serious injuries occur per year, based on the number of trucks required to transport New Jersey's two million tons per year of excess MSW to landfills in Pennsylvania, Virginia, and Ohio.(6)

Diesel fuel consumption of trucking to and from landfills and by equipment used in the burial of MSW in landfills generates air emissions and has other negative environmental impacts. All this energy consumption and diesel exhaust can be avoided by WTE facilities that use MSW as the fuel for generating electricity and steam energy at plants located near urban centers.

Material Recovery

Another beneficial effect of modern MSW combustion with energy recovery is material recovery. Using magnetic separators, the U.S. WTE industry recovers and recycles over 770,000 tons of ferrous scrap metal annually from the combustion ash residue.(8) At some facilities, non-ferrous metals are also removed through the use of "eddy current separators" that cause these materials to literally jump out of the remaining ash and into a recovery area. Metal processors sort this mixed metal into brass, aluminum, copper and other base metals.(9) The remaining ash can be used in the construction and maintenance of landfills and as an aggregate in construction.(10, 11)

Existing Obstacles for WTE Technology

The progress of WTE in the US has thus far been stifled by three factors that can be addressed through federal legislation and collective local efforts:

- Inconsistent environmental regulations for various energy sources.
- Failure to consider all environmental factors when local community environmental decisions are made.

- Uneven support by local officials and federal agencies.

Flow Control

Flow control is the authority needed by a municipality to direct the "flow" of its generated solid wastes into a disposal process chosen by the community, e.g., the local WTE facility. Normally, a community must issue bonds for construction of a large WTE facility and employ flow control to have firm waste delivery contracts in place during the term of the bond issue.[12]

When the US Supreme Court appeared to rule in the 1994 "Carbone" case that all existing attempts at such control were illegal under the Constitution because they restrained "commerce", they eliminated the ability of a community to finance WTE facilities. However, in the 2007 "United Haulers" decision, the Supreme Court has clarified the ability of local communities to finance long term revenue bond issues and control the flow of waste to these facilities. Moreover, the court recognized that Congress has, in RCRA, carved out a vital role for local government in the management of the nation's solid waste.

Implementation of Regulations

Environmental impact statements for any waste management facility (recycling, composting, WTE, waste hauling, and landfilling) should include a life-cycle analysis of all associated environmental and energy impacts that will result from each option. Even recycling, though laudatory, has negative, as well as positive, environmental effects. The impacts of the failure to make any community "improvement" should also be weighed in the evaluation of choices.

U.S. WTE facilities have complied with very stringent EPA regulations, known as Maximum Achievable Control Technology (MACT), at an estimated cost of over one billion dollars. By law, the Clean Air Act requires that every five years a review of these stringent emissions limits is conducted in order to determine whether lower limits are achievable.[13] Air quality regulations for all forms of combustion processes should have consistent health-based emissions limits for all facilities. If an emission is dangerous from one type of facility, then it is likely to be equally dangerous from another.

Disposal of solid waste from major urban areas in landfills frequently involves long haul trucking resulting in diesel exhaust pollution and the need for multiple waste transfer stations. Additionally, the landfilling process also results in diesel exhaust emissions and the long term generation of gaseous pollutants from the decomposition of trash in a landfill.

Public decision makers should carefully consider all environmental factors before adopting a solution to an environmental problem such as disposal of MSW. In addition, the public should be educated to know the benefits and burdens associated with each potential solution before making a final decision.

Recommended Actions by US Environmental Protection Agency

The US Environmental Protection Agency needs to fulfill its obligation to the public by advocating for the best solutions to environmental problems, including the disposal of MSW. Sound science should be the basis for decision-making. EPA must lead by educating the public as to the pros and cons that go with any solution and, thus, help overcome misconceptions about proven technological solutions. By means of public education, USEPA must lead in the application of the best environmental solutions.

In recent years, the EPA has taken a more active role in educating the public, by distinguishing in its annual reports between tonnages of MSW going to WTE and to landfilling, instead of lumping them together as "disposal". Also, some EPA regions have taken a pro-active role in educating the public in the benefits of WTE. For example, EPA Region 2 organized a one-day seminar in Puerto Rico at which they educated the general public on the benefits of WTE vs. landfilling, especially for an island where land is very scarce and precious. EPA has also re-instituted the hierarchy of integrated solid waste management, which places waste-to-energy above landfill disposal. We applaud these efforts undertaken by the EPA and feel that now is the time to build upon them.

It is given that no one wants a new public facility of any sort near their homes, whether it is an airport, highway, water treatment plant or a waste disposal facility. We feel that it is paramount that environmental regulators coordinate with local officials to hold public hearings where new facilities and technologies and the "do-nothing" consequences can be discussed. Additionally, we feel that the EPA should actively promote WTE as a mutually beneficial endeavor for both local communities and the nation.

Recommended Actions by Congress

The following actions are recommended by the ASME Solid Waste Processing Division to advance the use of WTE technology in the US and reap the energy benefits of a homegrown, renewable energy source and of reduced local, regional, and global emissions:

- Congress should re-examine and reconsider the level of regulatory limits required for all new sources of energy. MACT regulations have worked well for waste-to-energy facilities and they are equally able to control emissions from all other sources of combustion based energy production.

- Congress, in an effort to expand WTE, should consider enacting legislation that would make renewable energy credits available for WTE under the definitions of green or renewable energy.

- Congress should direct EPA to study and post notice regarding the effects of the "whole picture" for all available waste management options.

The ASME Solid Waste Processing Division believes that these policy recommendations, if fully adopted, could successfully take advantage of a unique opportunity to develop a renewable, clean energy source at a critical time for our nation. The country will also be well served by recovery of reusable materials, reduced truck traffic and highway congestion, less dependence on landfill for solid waste disposal, and less dependence on foreign sources of energy.

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(8) C. Wiles and P. Shephard, April 1999 USDOE, 126 Pg. Booklet #BK-570-25841 "Beneficial Use and Recycling of Municipal Combustion Residues – A Comprehensive Resource Document" by the National Renewable Energy Laboratory.

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(10) S. Lucido, May 2000: "The Use of Municipal Waste Combustor Ash as a Partial Replacement of Aggregate in Bituminous Paving Material", Proceedings of the 8th North American Waste to Energy Conference.

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This position statement represents the views of the Solid Waste Processing Division and Energy Committee of ASME's Technical Communities of Knowledge and Community and is not necessarily a position of ASME as a whole.

Waste-to-energy

From Wikipedia, the free encyclopedia

Waste-to-energy (WtE) or **energy-from-waste** (EfW) is the process of creating energy in the form of electricity or heat from the incineration of waste source. WtE is a form of energy recovery. Most WtE processes produce electricity directly through combustion, or produce a combustible fuel commodity, such as methane, methanol, ethanol or synthetic fuels.[1]

Spittelau incineration plant is one of several plants that provides district heating in Vienna.

Contents

Incineration [edit]

Main article: Incineration

Incineration, the combustion of organic material such as waste with energy recovery is the most common WtE implementation. Incineration may also be implemented without energy and materials recovery; however, this is increasingly being banned in OECD (Organisation for Economic Co-operation and Development) countries.[*citation needed*] Furthermore, all new WtE plants in OECD countries must meet strict emission standards.[*citation needed*] Hence, modern incineration plants are vastly different from the old types, some of which neither recovered energy nor materials. Modern incinerators reduce the volume of the original waste by 95-96 %, depending upon composition and degree of recovery of materials such as metals from the ash for recycling.[2]

Concerns regarding the operation of incinerators include fine particulate, heavy metals, trace dioxin and acid gas emissions, even though these emissions are relatively low[3] from modern incinerators. Other concerns include toxic fly ash and incinerator bottom ash (IBA) management.[*citation needed*] Discussions regarding waste resource ethics include the opinion that incinerators destroy valuable resources and the fear that they may reduce the incentives for recycling and waste minimization activities.[*citation needed*] Incinerators have electric efficiencies on the order of 14-28%.[*citation needed*] The rest of the energy can be utilized for e.g. district heating, but is otherwise lost as waste heat.

The method of using incineration to convert municipal solid waste (MSW) to energy is a relatively old method of waste-to-energy production. Incineration generally entails burning garbage to boil water which powers steam generators that make electric energy to be used in our homes and businesses. One serious problem associated with incinerating MSW to make electrical energy, is the pollutants that are put into the atmosphere when burning the garbage that power the generators. These pollutants are extremely acidic and have been reported to cause serious environmental damage by turning rain into acid rain. One way that this problem has been significantly reduced is through the use of lime scrubbers on smokestacks. The limestone mineral used in these scrubbers has a pH of approximately

8 which means it is a base. By passing the smoke through the lime scrubbers, any acids that may be in the smoke are neutralized which prevents the acid from reaching the atmosphere and hurting our environment. (Field) According to the New York Times, modern incineration plants are so clean that "many times more dioxin is now released from home fireplaces and backyard barbecues than from incineration."[4]

WtE technologies other than incineration [edit]

There are a number of other new and emerging technologies that are able to produce energy from waste and other fuels without direct combustion. Many of these technologies have the potential to produce more electric power from the same amount of fuel than would be possible by direct combustion. This is mainly due to the separation of corrosive components (ash) from the converted fuel, thereby allowing higher combustion temperatures in e.g. boilers, gas turbines, internal combustion engines, fuel cells. Some are able to efficiently convert the energy into liquid or gaseous fuels:

Thermal technologies:

- Gasification (produces combustible gas, hydrogen, synthetic fuels)
- Thermal depolymerization (produces synthetic crude oil, which can be further refined)
- Pyrolysis (produces combustible tar/biooil and chars)
- Plasma arc gasification PGP or plasma gasification process (produces rich syngas including hydrogen and carbon monoxide usable for fuel cells or generating electricity to drive the plasma arch, usable vitrified silicate and metal ingots, salt and sulphur)

Non-thermal technologies:

- Anaerobic digestion (Biogas rich in methane)
- Fermentation production (examples are ethanol, lactic acid, hydrogen)
- Mechanical biological treatment (MBT)
  - MBT + Anaerobic digestion
  - MBT to Refuse derived fuel

Global WTE developments [edit]

During the 2001-2007 period, the WTE capacity increased by about four million metric tons per annum. Japan and China built several plants that were based on direct smelting or on fluid bed combustion of solid waste. In China there are about 50 WTE plants. Japan is the largest user in thermal treatment of MSW in the world with 40 million tons. Some of the newest plants use stoker technology and others use the advanced oxygen enrichment technology. There are also over one hundred thermal treatment plants using relatively novel processes such as direct smelting, the Ebara fluidization process and the Thermo- select -JFE gasification and melting technology process.[5] In Patras, Greece, a Greek company just finished testing a system that shows potential. It generates 25kwatts of electricity and 25kwatts of heat from waste water.[6] In India its first energy bio-science center was developed to reduce the country's green house gases and its dependency on fossil fuel.[7]

Biofuel Energy Corporation of Denver, CO, opened two new biofuel plants in Wood River, NE, and Fairmont, MN, in July 2008. These plants use distillation to make ethanol for use in motor vehicles and other engines. Both plants are currently reported to be working at over 90% capacity. Fulcrum BioEnergy incorporated located in Pleasanton, CA, is currently building a WTE plant near Reno, NV. The plant is scheduled to open in early 2010 under the name of Sierra BioFuels plant. BioEnergy incorporated predicts that the plant will produce approximately 10.5 million gallons per year of ethanol from nearly 90,000 tons per year of MSW.(Biofuels News)

Waste to energy technology includes fermentation, which can take biomass and create ethanol, using waste cellulosic or organic material. In the fermentation process, the sugar in the waste is changed to carbon dioxide and alcohol, in the same general process that is used to make wine. Normally fermentation occurs with no air present. Esterification can also be done using waste to energy technologies, and the result of this process is biodiesel. The cost effectiveness of esterification will depend on the feedstock being used, and all the other relevant factors such as transportation distance, amount of oil present in the feedstock, and others.[8] Gasification and pyrolysis by now can reach thermal conversion efficiencies from of up to 75%, however a complete combustion is superior in terms of fuel conversion efficiency.[9] Some pyrolysis processes need an outside heat source which may be supplied by the gasification process, making the combined process self sustaining.

Carbon dioxide emissions [edit]

In thermal WtE technologies, nearly all of the carbon content in the waste is emitted as carbon dioxide (CO_2) to the atmosphere (when including final combustion of the products from pyrolysis and gasification). Municipal solid waste (MSW) contain approximately the same mass fraction of carbon as CO_2 itself (27%), so treatment of 1 metric ton (1.1 short tons) of MSW produce approximately 1 metric ton (1.1 short tons) of CO_2.

In the event that the waste was landfilled, 1 metric ton (1.1 short tons) of MSW would produce approximately 62 cubic metres (2,200 cu ft) methane via the anaerobic decomposition of the biodegradable part of the waste. This amount of methane has more than twice the global warming potential than the 1 metric ton (1.1 short tons) of CO_2, which would have been produced by combustion. In some countries, large amounts of landfill gas are collected, but still the global warming potential of the landfill gas emitted to atmosphere in e.g. the US in 1999 was approximately 32 % higher than the amount of CO_2 that would have been emitted by combustion.[10]

In addition, nearly all biodegradable waste is biomass. That is, it has biological origin. This material has been formed by plants using atmospheric CO_2 typically within the last growing season. If these plants are regrown the CO_2 emitted from their combustion will be taken out from the atmosphere once more.

Such considerations are the main reason why several countries administrate WtE of the biomass part of waste as renewable energy.[11] The rest - mainly plastics and other oil and gas derived products - is generally treated as non-renewables.

Determination of the biomass fraction [edit]

Several methods have been developed by the European CEN 343 working group to determine the biomass fraction of waste fuels, such as Refuse Derived Fuel/Solid Recovered Fuel. The initial two methods developed (CEN/TS 15440) were the **manual sorting method** and the **selective dissolution method**. A detailed systematic comparison of these two methods has been recently published.[12] Since each method suffered from limitations in properly characterizing the biomass fraction, two alternative methods have been developed.

The first method uses the principles of radiocarbon dating. A technical review (CEN/TR 15591:2007) outlining the carbon 14 method was published in 2007. A technical standard of the carbon dating method (CEN/TS 15747:2008) will be published in 2008. In the United States, there is already an equivalent carbon 14 method under the standard method ASTM D6866.

The second method (so called **balance method**) employs existing data on materials composition and operating conditions of the WtE plant and calculates the most probable result based on a mathematical-statistical model.[13] Currently the balance method is installed at three Austrian incinerators.

A comparison between both methods carried out at three full-scale incinerators in Switzerland showed that both methods came to the same results.[14]

Although carbon 14 dating can determine with some precision the biomass fraction of waste, it cannot determine directly the biomass calorific value. Determining the calorific value is important for green certificate programs such as the Renewable Obligation Certificate program in the United Kingdom. These programs award certificates based on the energy produced from biomass. Several research papers, including the one commissioned by the Renewable Energy Association in the UK, have been published that demonstrate how the carbon 14 result can be used to calculate the biomass calorific value. By contrast the balance method delivers all required information, namely, the ratio between biogenic and fossil energy production, as well as relative and total biogenic and fossil mass and carbon fractions. Moreover it requires no additional measurements and is therefore easy to install at low costs.

Examples of waste-to-energy plants [edit]

According to ISWA there are 431 WtE plants in Europe (2005) and 89 in the United States (2004).[15] Below is a list of a few examples of WtE plants.

- Edmonton Municipal Waste-to-Ethanol gasification Plant fueled by MSW, scheduled for start of construction by the end of 2009[16]

The following are examples of waste incineration WtE plants:

- Montgomery County Resource Recovery Facility in Dickerson, Maryland, USA (1995)
- Spittelau (1971), and Flötzersteig (1963), Vienna, Austria (Wien Energie)
- SYSAV in Malmö (2003 and 2008), Sweden (Flash presentation)
- Algonquin Power, Brampton, Ontario, Canada [17]
- Teesside EfW plant near Middlesbrough, North East England (1998)
- Edmonton Incinerator in Greater London, England (1974)

See also [edit]

Energy portal

- Biohydrogen production
- Biomass
- Cogeneration
- Energy recycling
- List of solid waste treatment technologies
- Manure-derived synthetic crude oil
- Refuse-derived fuel
- Relative cost of electricity generated by different sources
- Waste management

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External links [edit]

- Waste-to-Energy Research and Technology Council
- WtERT Germany
- LowCarbonEconomy.com
- Gasification Technologies Council

LEGISLATIVE RESEARCH SERVICES

Alaska State Legislature
Division of Legal and Research Services
State Capitol, Juneau, AK 99801

(907) 465-3991 phone
(907) 465-3908 fax
research@legis.state.ak.us

Memorandum

TO: Representative Pete Petersen

FROM: Roger Withington, Legislative Analyst

DATE: October 24, 2011

RE: Permits Required for Waste-to-Energy Plants in Alaska
LRS Report 12.041

You asked for information regarding waste-to-energy electrical generation plants. Specifically, you asked for the list of permits—both federal and state—required to construct and operate a waste-to-energy electrical generation plant in Alaska. You also asked how long the permitting process would take.

Generally, waste-to-energy electrical generation is the process of creating electricity or heat from the incineration of waste. For the most part, waste-to-energy processes produce electricity directly from the combustion of waste or from the combustion of a fuel, such as methane, extracted from decomposing waste. The Alaska Energy Authority classifies municipal waste as a biomass fuel, along with wood, sawmill waste, and fish byproducts.[1]

Devany Plentovich, Program Manager for the Alaska Energy Authority, provided us with a list of permits that a potential waste-to-energy project in Alaska would need in order to be constructed and subsequently operate.[2] Ms. Plentovich cautions that there is no single source for all of the permit requirements and, because each project is unique, permitting is dependent on many variables such as the funding source, location, size, raw material supply, waste products, and the technology to be used. The table on the following page lists and describes the major permitting areas that must be considered when pursuing a waste-to-energy project. Please keep in mind that this list is likely not exhaustive and does not include any local construction and zoning ordinances that may affect the development of a waste-to-energy plant.

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[1] The Alaska Energy Authority (AEA) was created in 1976 by the Alaska Legislature and is a public corporation of the state with a separate and independent legal existence. The mission of the Alaska Energy Authority is to reduce the cost of energy in Alaska. According to the AEA, approximately 650,000 tons of garbage is generated each year in Alaska and currently, there is no large scale recovery of energy from the burning of unsorted garbage. The AEA provides information on biomass energy at *http://www.akenergyauthority.org/programsalternativebiomass.html*.

[2] Devany Plentovich, Program Manager - Biomass/CHP, Alaska Energy Authority, (907) 771-3068.

Permitting Considerations for Waste-to-Energy Power Plants in Alaska	
Agency	**Summary**
Environmental Protection Agency	If the waste-to-energy project is on Federal land or is funded through a Federal source, it falls under the National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.], which establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment. To meet the NEPA requirements, all involved federal agencies prepare a detailed statement, known as an Environmental Impact Statement (EIS), assessing the environmental impact of, and the alternatives to, major federal actions that significantly affect the environment. The Environmental Protection Agency reviews and comments on the EISs prepared by the other federal agencies, maintains a national filing system for all EISs, and assures that its own actions comply with NEPA. *http://www.epa.gov/compliance/nepa/*
Alaska Department of Natural Resources	The Alaska Department of Natural Resources, Office of Project Management and Permitting (OPMP), coordinates the review of large scale projects. Because of the complexity and potential impact that waste-to-energy projects have on multiple divisions or agencies, these projects typically benefit from a single primary point of contact to facilitate interagency coordination and a cooperative working relationship with the project proponent. *http://dnr.alaska.gov/commis/opmp/* In addition, the Alaska State Historic Preservation Office becomes involved with archaeological and historical resources. *http://dnr.alaska.gov/parks/oha/shpo/shpo.htm*
Alaska Department of Environmental Conservation	Air quality permitting is required for most waste-to-energy projects through the Alaska Department of Environmental Conservation's (DEC) Air Permit Program, which is divided into two categories: Title I and Title V. New and existing facilities that propose to construct or modify a stationary source of air pollution would likely need a permit under Title I. The Title V program issues operating permits and emission limit permits. *http://dec.alaska.gov/air/ap/permit.htm* In addition, the DEC issues water use, solid waste, hazardous waste, and water treatment permits. *http://dec.alaska.gov/index.htm*
Alaska Division of Fire and Life Safety	The Alaska Division of Fire and Life Safety Construction must approve the repair, remodel, addition, or change of occupancy of any building or structure, or the installation or modification of a fuel tank. *http://www.dps.alaska.gov/fire/PRB/*
Regulatory Commission of Alaska	The Regulatory Commission of Alaska must issue a Certificate of Public Convenience and Necessity if the waste-to-energy project is to generate electricity. *http://rca.alaska.gov/RCAWeb/home.aspx*
Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service	The Alaska Department of Fish and Game and the US Fish and Wildlife Service will be involved in any project with threatened or endangered species and habitat issues. *http://www.adfg.alaska.gov/index.cfm?adfg=license.main* *http://www.fws.gov/permits/*
U.S. Army Corps of Engineers	The Army Corps of Engineers requires permitting for wetlands and other protected areas. *http://www.poa.usace.army.mil/hm/default.htm*
Other possible agencies	The National Resources Conservation Services due to certain land development issues. *http://www.nrcs.usda.gov/* Federal Communications Commission for telecommunications interference and aviation considerations. *http://www.fcc.gov/* Alaska Department of Transportation and Public Facilities for right-of-way issues and transportation of hazardous materials. *http://www.dot.state.ak.us/stwddes/dcsrow/index.shtml* Bureau of Alcohol, Tobacco, Firearms and Explosives for any process that requires distillation. *http://www.atf.gov/* U.S. Coast Guard for issues related to the barging of materials. *http://www.uscg.mil/*
Notes: **Source:**	This list is likely not exhaustive and does not include any local construction and zoning ordinances. Devany Plentovich, Program Manager - Biomass/CHP, Alaska Energy Authority, (907) 771-3068.

Tom Crafford, Director of the Office of Project Management and Permitting (OPMP), Alaska Department of Natural Resources, notes that his agency has not as yet been involved in the permitting of waste-to-energy electrical plants.[3] As a result, he is not able to provide us with an exhaustive list of necessary permits, nor an estimate of the length of time required to issue the permits. Mr. Crafford also notes that permitting for projects is often very project-specific and dependent on a number of factors, some of which may include:

- Whether the plant would be dedicated to a specific facility, such as a school, or be connected to a power grid;
- The anticipated electrical generation capacity of the proposed plant;
- The type of waste being considered as fuel;
- The ownership—public or private—of the plant;
- Whether the plant is to be located on state, private, federal or municipal land; and
- If transmission lines are required to deliver the electricity.

Mr. Crafford further notes that the project permitting timeline is generally dependent upon the number of permits and authorizations required by the project, the public notice and comment requirements necessitated by the project, the public support for and opposition to the project, the quality of permit applications, the experience of the applicants and their consultants, and whether or not permitting decisions are appealed.

We hope this is helpful. If you have questions or need additional information, please let us know.

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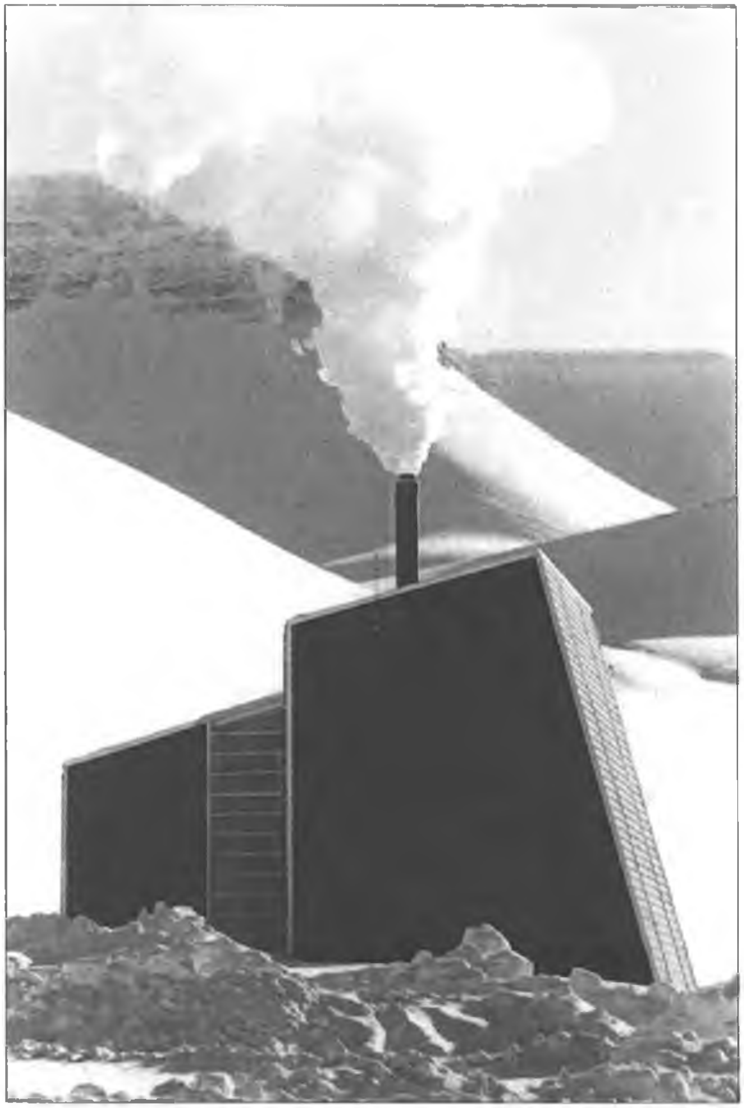
[3] Tom Crafford, Director of the Office of Project Management and Permitting, Alaska Department of Natural Resources, (907) 269-8629.



MUNICIPAL AND INDUSTRIAL WASTE INCINERATION PLANT

Funi Waste Management Company is owned by Ísafjörður municipality in north west Iceland, serving seven communities in and around the town of Ísafjörður.

The waste stream is highly seasonal, averaging around 3,500 tonnes of waste annually. The plant was originally supplied in accordance with local regulation, and was recently upgraded to comply with the European Waste Incineration Directive, 2000/76/EC.

The plant has a design capacity 700 kg/h at a calorific value of 11.5 MJ/kg, and produces district heating to the nearby community.

ENVIKRAFT A/S

Waste To Energy Systems

Envikraft A/S in Birkerød Denmark supplied the turn-key system for the treatment of domestic and industrial waste at FUNI Waste Management. In addition, the plant is capable of treating medical and animal carcass waste – a feature available only with our special designed refractory lined bed.

The scope

Fully automatic waste crane, waste hopper, incinerator, ash and slag transportation, hot water boiler system, fluegas treatment system, adsorption system with silos and dosing system and a system to supply district heating.

The complete plant is automatically controlled and monitored via a control system designed by **Envikraft**.

Special features

- ✓ Low fly ash carryover (app. 300 mg/Nm^3 at incinerator outlet)
- ✓ Efficient burnout of particles
- ✓ Efficient burnout of bottom ashes

Main plant data

Nominal capacity	700 kg/h
Waste calorific value	11.5 MJ/kg $_{Av}$
Boiler output	1,6 MW
Pressure	6 bar$_g$
Water production	68 m^3/h
District heating production	1.5 MW

Emissions to air*

Dust	10	mg/Nm^3
TOC	10	mg/Nm^3
HCL	10	mg/Nm^3
HF	1	mg/Nm^3
SO_2	50	mg/Nm^3
NO_x	400	mg/Nm^3
CO	50	mg/Nm^3
Hg	0.1	mg/Nm^3
Dioxins	0.1	ng/Nm^3

** Standardized at 273 °K, 101.3 kPa, 11 % oxygen, dry gas.*

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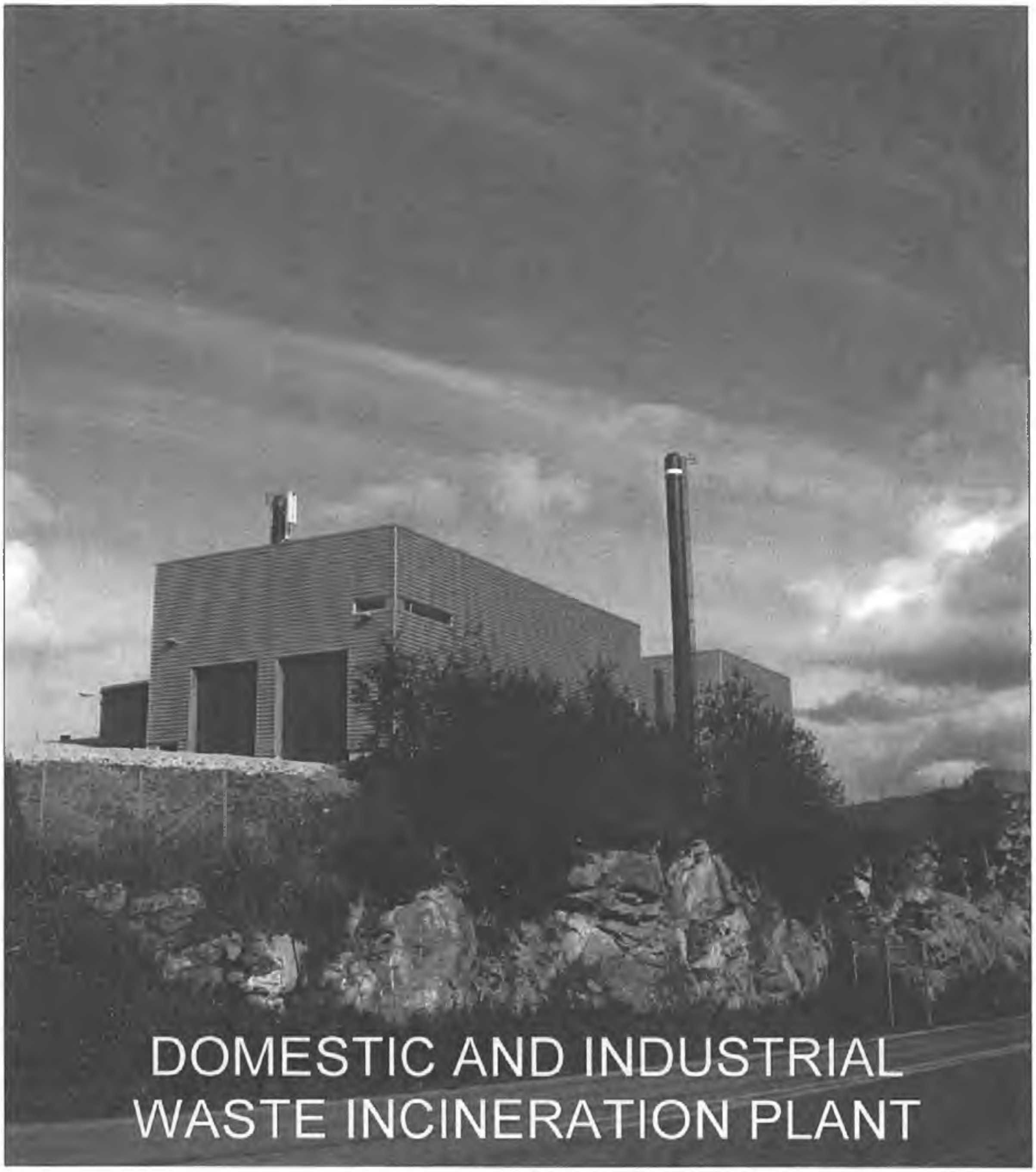

In 2005, Senja Avfallselskap contracted their new waste to energy plant with Envikraft A/S. Senja Avfallselskap is an intermunicipal company owned by a number of municipalities in northern Norway.

The company treats up to 16,000 tonnes of waste annually, and it is the first waste treatment company in the region to build a new modern waste incineration plant in accordance with the European directive on waste incineration, Directive 2000/76/EC. The plant is the only licensed MSW plant in Norway approved to co-treat medical-, animal and other hazardous waste types.

The plant has a design capacity 2 t/h at a calorific value of 11.5 MJ/kg, and produces both electricity and district heating.

ENVIKRAFT A/S

Waste To Energy Systems

Envikraft A/S in Birkerød Denmark supplies a turn-key system for the treatment of domestic and industrial waste at Senja Avfallselskap. In addition, the plant is capable of treating medical and animal carcass waste – a feature available only with our special designed refractory lined bed.

The scope

Fully automatic waste crane, waste hopper, incinerator, ash and slag transportation with separator for metals, steam boiler system with ECO part, fluegas treatment system, adsorption system with silos and dosing system, SNCR technology for the reduction of NO_x, steam engine and power generator and district heating supply system.

The complete plant is controlled and monitored via a SCADA system designed by **Envikraft**.

Special features

- ✓ Low fly ash carryover (app. 300 mg/Nm^3 at incinerator outlet)
- ✓ Efficient burnout of particles
- ✓ Efficient burnout of bottom ashes
- ✓ Separate boiler system minimizes risk of corrosion

Main plant data

Nominal capacity	2 t/h
Waste calorific value	11.5 MJ/kg $_{Av}$
Steam quality	Saturated steam
Pressure	13 bar$_g$/195 °C
Steam production	7 t/h
Power production	318 kW$_{el}$
District heating production	4.5 MW

Emissions to air* - guarantee values

Dust	4	mg/Nm^3
TOC	8	mg/Nm^3
HCL	10	mg/Nm^3
HF	0,5	mg/Nm^3
SO_2	50	mg/Nm^3
NO_x	200	mg/Nm^3
CO	50	mg/Nm^3
Hg	0.04	mg/Nm^3
Dioxins	0.1	ng/Nm^3

** Standardized at 273 °K, 101.3 kPa, 11 % oxygen, dry gas.*

Emissions to water

None

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Cleaner waste-to-energy in Finnish Lahti

While demands for climate change mitigation grow tighter, Lahti Energia, an energy company in southern Finland is doing its bit to clean the air. Equipped with the newest gasification techniques and a long-term loan from NIB, a new waste-to-energy power plant is expected to substantially decrease annual CO_2 emissions in the region.

Lahti Energia, the local energy company owned by the City of Lahti, is currently building a new waste-to-energy plant, due to be ready for commercial use in spring 2012. The project is partly financed with a NIB loan of EUR 50 million.

Construction of the new power plant.
Photos: Nina Näsman

Burning waste for energy has previously been seen as ineffective and polluting. Attitudes towards it, however, have begun to change as national as well as international plans for better waste treatment and new, cleaner technologies have been developed.

Lahti Energia has been one of the first energy companies in the world to use gasification as a method for combustion. The new power plant will also be equipped with gas cleaners and coolers. That needs to be done in order to reduce harmful emissions. This is the first time a similar process is in commercial use in Finland.

Thanks to the innovative features, the new power plant has become an EU showcase. According to Janne Savelainen, CEO of Lahti Energia, this signifies increased visibility and continuous interest from abroad.

"Many different actors, including technology developers, investors and customers, share our goal of developing energy production technologies that can produce energy from poorer fuels in a more environmentally friendly and highly efficient way," Savelainen says.

The choice to use waste as fuel was obvious for Lahti Energia, due to its location in the Päijät-Häme region where most waste is efficiently sorted. The waste that would otherwise be deposited into landfills comes from business, industry and households in the region.

Current annual fuel consumption of waste is around 100,000 tonnes at Lahti Energia, while the new plant will utilise 250,000 tonnes of recycled waste annually. According to Savelainen, this is about 10% of total municipal waste suited for incineration in Finland.

The combined heat and power plant will have an estimated production capacity of 50MW of electricity and 90MW of district heat, enough capacity to reach most households, businesses and industry in the Lahti region.

The new power plant is rising next to Lahti Energia's old coal-fired power plant, thus utilising established infrastructure and power networks. The shift from mainly coal to waste-fuelled energy production also means that there is roughly a 50% drop in the need for fossil fuels in the Lahti region, further translating into decreased annual CO_2 emissions.

Savelainen believes in a bright future for waste-to-energy power plants, as people learn to utilise waste more efficiently and favour green investments for future generations.

Thus in a few years time, when the new waste-to-energy plant is ready for use, residents and businesses in the Lahti region can rest assured that their recycling efforts have not been a waste of energy.

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ENERGY RECOVERY COUNCIL

March 22, 2011

Representative Pete Petersen
Alaska House of Representatives
State Capitol, Room 422
Juneau, AK 99801-1182

Dear Representative Petersen:

On behalf of the Energy Recovery Council (ERC), I would like to take this opportunity to commend you for introducing House Concurrent Resolution 10 (HCR 10) and to offer our support for the resolution. The waste-to-energy sector generates clean, renewable energy across the United States while providing communities with and responsible and sustainable waste management alternative.

ERC is a national trade group representing companies and communities engaged in the waste-to-energy sector. Waste-to-energy facilities generate renewable electricity using modern combustion technology equipped with state-of-the-art emissions control systems. ERC members include: Covanta Energy Corporation, Wheelabrator Technologies Inc., Babcock & Wilcox, several dozen businesses and organizations in the municipal solid waste (MSW) management and energy fields, and 28 municipalities that are served by waste-to-energy plants.

ERC supports your resolution which would encourage the State of Alaska, its municipalities, and private organizations to consider waste-to-energy to help meet your energy and waste management needs. Waste-to-energy facilities across the country—and, in fact, the world—have helped communities manage their trash in a sustainable manner that complements recycling and reduces the demand for landfilling. In fact, the U.S. Environmental Protection Agency's solid waste hierarchy stipulates that waste-to-energy is preferable to landfills. In addition, EPA has stated that waste-to-energy facilities produce electricity "with less environmental impact than almost any other source of electricity." Alaska would benefit greatly from generating energy from waste.

In conclusion, ERC supports HCR 10 and urges the Alaska legislature to adopt it quickly. If I can be of any assistance, please do not hesitate to contact me at (202) 467-6240 or tmichaels@energyrecoverycouncil.org.

Sincerely,

Ted Michaels

Ted Michaels
President